

**WHAT IS CLAIMED IS:**

1. An inspection system adapted to inspect structures on a substrate, the inspection system comprising:
  - a beam generator adapted to direct a primary beam at the substrate at a variable scanning angle, thereby producing a secondary beam having properties
  - 5 that are characteristic of properties of the structures on the substrate,
  - a stage adapted to scan the substrate relative to the primary beam at a selectable speed,
  - a sensor adapted to receive the secondary beam and provide analog signals having properties that are characteristic of the properties of the secondary beam,
  - 10 an analog to digital converter adapted to receive the analog signals and provide digital signals having properties that are characteristic of the properties of the analog signals, and
  - a controller adapted to receive the digital signals and determine the properties of the structures on the substrate based at least in part on the properties of the
  - 15 digital signals.
2. The inspection system of claim 1, wherein the variable angle is between about forty-five degrees and about ninety degrees.
3. The inspection system of claim 1, wherein the variable angle is about forty-five degrees.
4. The inspection system of claim 1, wherein the selectable speed is equal to about cosine of ninety degrees minus the variable angle, times a nominal speed used when the variable angle is ninety degrees.
5. The inspection system of claim 1, wherein the secondary beam is a reflected beam.
6. The inspection system of claim 1, wherein the substrate is a semiconductor wafer.

7. The inspection system of claim 1, wherein the substrate is a mask for an integrated circuit layer.

8. An inspection system adapted to inspect structures on a substrate, the inspection system comprising:

5 a beam generator adapted to direct a primary beam at the substrate at an adjustable angle, thereby producing a secondary beam having properties that are characteristic of properties of the structures on the substrate, means for adjusting a selectable angle at which the primary beam impinges on the substrate,

10 a substrate stage adapted to hold the substrate underneath the primary beam, means for scanning at least one of the substrate and the primary beam relative to the other at a selectable speed,

an input adapted to receive the selectable angle and the selectable speed,

15 a sensor adapted to receive the secondary beam and provide analog signals having properties that are characteristic of the properties of the secondary beam, an analog to digital converter adapted to receive the analog signals and provide digital signals having properties that are characteristic of the properties of the analog signals, and

20 a controller adapted to adjust the selectable angle, adjust the selectable speed, receive the digital signals, and determine the properties of the structures on the substrate based at least in part on the properties of the digital signals.

9. The inspection system of claim 8, wherein the beam is a laser beam.

10. The inspection system of claim 8, wherein the selectable angle is between about forty-five degrees and about ninety degrees.

11. The inspection system of claim 8, wherein the selectable angle is about forty-five degrees.

12. The inspection system of claim 8, wherein the selectable speed is equal to about cosine of ninety degrees minus the selectable angle, times a nominal speed used when the selectable angle is ninety degrees.
13. The inspection system of claim 8, wherein the substrate is a semiconductor wafer.
14. The inspection system of claim 8, wherein the substrate is a mask for an integrated circuit layer.
15. The inspection system of claim 8, wherein the secondary beam is a reflected beam.
16. The inspection system of claim 8, wherein the secondary beam is a transmitted beam.
17. A method to inspect structures on a substrate, the method comprising the steps of:  
directing a primary beam at the substrate at a selectable angle, thereby producing  
a secondary beam having properties that are characteristic of properties of  
the structures on the substrate,  
5 scanning at least one of the substrate and the primary beam relative to the other at  
a selectable speed and in a direction, where the selectable angle is not  
ninety degrees relative to the direction,  
receiving the secondary beam and providing analog signals having properties that  
are characteristic of the properties of the secondary beam,  
10 receiving the analog signals and providing digital signals having properties that  
are characteristic of the properties of the analog signals, and  
determining the properties of the structures on the substrate based at least in part  
on the properties of the digital signals.
18. The method of claim 17, wherein the beam is a laser beam.
19. The method of claim 17, wherein the secondary beam is a reflected beam.
20. The method of claim 17, wherein the selectable angle is about forty-five degrees.